

NON-PUBLIC?: N
ACCESSION #: 8805020090
LICENSEE EVENT REPORT (LER)

FACILITY NAME: St. Lucie Unit 1 PAGE: 1 of 3

DOCKET NUMBER: 05000335

TITLE: Reactor Trip on Low Steam Generator Level Due to Main Feed
Regulating Valve Equipment Failure
EVENT DATE: 3/28/88 LER #: 88-003-00 REPORT DATE: 04/27/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Victor N. Mendoza, Shift Technical Advisor
TELEPHONE #: 407-468-4155

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JB COMPONENT: CPOS MANUFACTURER: F120
REPORTABLE TO NPRDS: NO

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On March 27, 1988, St. Lucie Unit 1 was in Mode 1, 100% power and at steady state conditions. All plant controls were in their normal operating line-up. At approximately 00:01 EDT, on March 28, 1988, a malfunction of the Main Feedwater Control System (EIS:JB) was observed and the Main Feedwater regulating valve closed. The closure of the valve generated a low Steam Generator level signal from the Reactor Protection System and caused the Reactor to automatically trip. All systems functioned as designed and the plant was maintained at a stable condition. There were no radiological releases observed during the event. The health and safety of the public was not endangered throughout the event. The reactor trip was observed as an uncomplicated reactor trip.

The root cause of the event was due to the malfunction of the Feedwater regulating valve positioner causing the valve to overshoot its pre-set position on the closing stroke. Some of the contributing factors to the valve closure were (1) the steam flow/feed flow mismatch controller was sluggish and had low output signals, and (2) the electrical to pneumatic converter signals were not consistent.

Immediate corrective actions were (1) replace the steam flow/feed flow mismatch controller, (2) the electrical to pneumatic converter was cleaned and adjusted, and (3) the valve positioner was cleaned and adjusted.

(End of Abstract)

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DESCRIPTION OF EVENT:

On March 27, 1988, St. Lucie Unit 1 was in Mode 1, 100% Power and at steady state conditions. Immediately prior to the reactor trip, an alarm was annunciated in the control room indicating a low pressure on the Feedwater regulating valve air supply. The reactor operator noticed that the "B" Steam Generator level was increasing. The reactor operator immediately contacted the turbine operator to check the "B" Feedwater regulating valve air supply lineup and to check for any abnormalities. No abnormal lineups were noted. The Steam Generator level increased from its normal level of 65% to 70% before it started to decrease and was decreasing more rapidly. As the level decreased to 65%, the reactor operator was instructed to prepare to transfer the feedwater regulating control from "AUTO" to "MANUAL" when the level decreased to 60%. Prior to transferring the controls from "AUTO" to "MANUAL", the reactor operator had to "preview" the automatic output setting to be matched with the manual output. As the level reached the 60% level, the reactor operator transferred the feedwater control to "MANUAL" in order to manually control the feed flow but the rate of level decrease was too rapid for manual recovery due to the closing of the feedwater regulating valve. The reactor tripped on low Steam Generator level. All safety functions were met during the trip. The Steam Generator levels were restored by the Auxiliary Feedwater System. There were no abnormal system responses other than the "1B" Atmospheric Dump Valve which failed to open, but the "1A" Atmospheric Dump Valve was fully operational as well as the Steam Bypass Control System. The plant was maintained in a stable condition. This event was observed as a normal uncomplicated Reactor trip.

CAUSE OF EVENT:

The root cause of the event was attributed to the failure of the feedwater regulating valve positioner causing the valve to overshoot its pre-set position on the closing stroke. Some of the contributing factors for the failure of the valve positioner were (1) the electrical to pneumatic converter response was not consistent which may have provided a fluctuating air signal to the valve positioner which controls the feedwater regulating valve position, and (2) the steam flow/feed flow mismatch controller was sluggish and had low output signal.

ANALYSIS OF EVENT:

This event is reportable under 10 CFR 50.73 (a) (2) (iv), "any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protective System (RPS)." The RPS trip on low Steam Generator (S/G) level was observed to be an uncomplicated trip in which all safety functions were met. The RPS low S/G level trip is designed to prevent Reactor operation with S/G water level below the minimum volume required for heat removal, ensuring that the design pressure of the Reactor Coolant System (RCS) will not be exceeded due to loss of S/G heat sink. The trip setpoint provides enough allowance to ensure that there will be sufficient water inventory in the Steam Generators at the time of the trip to provide the necessary heat removal capability. The Auxiliary Feedwater Actuation System (AFAS) was working as designed. All the Auxiliary Feedwater Pumps: 1A, 1B and 1C, started as required to maintain Steam Generator levels.

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ANALYSIS OF EVENT (continued)

The plant responses to this reactor trip were within the expected responses as bounded by the Plant's Final Updated Safety Analysis Report (FUSAR), section 15.2.8, which assumes the loss of all feedwater and condensate pumps. The actual plant response was more conservative compared to what was analyzed on the FUSAR. At no time during the entire event was the health and safety of the public endangered and no plant safety functions were compromised.

CORRECTIVE ACTIONS:

1. The steam flow/feed flow mismatch controller was replaced.
2. The electrical to pneumatic converter was cleaned and adjusted.
3. The valve positioner was cleaned and adjusted.
4. The feedwater control system instrumentation in the instrument racks were checked and tested to be satisfactorily functional.
5. A "1B" Atmospheric Dump Valve wiring discontinuity was repaired and was tested to be satisfactorily functional.

ADDITIONAL INFORMATION:

Failed Component Identification:

Steam flow/feed flow mismatch controller

Manufacturer: Fischer Porter

Model Number: 53EL4531BBKB-E

PREVIOUS SIMILAR EVENT:

For a previous similar event, see LER #389-87-002, which pertains to a reactor trip on low Steam Generator level due to Main Feedwater Regulating Valve failure on St. Lucie Unit 2.

ATTACHMENT # 1 TO ANO # 8805020090 PAGE: 1 of 1

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FPL

APRIL 27 1988

L-88-198

10 CFR 50.73

U. S. Nuclear Regulatory Commission

Attn: Document Control Desk

Washington, D. C. 20555

Gentlemen:

Re: St. Lucie Unit 1

Docket No. 50-335

Reportable Event: 88-03

Date of Event: March 28, 1988

Reactor Trip on Low Steam Generator Level

Due to Main Feed Regulating Valve Equipment Failure

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,

/s/ J. K. Hays for

W. F. Conway

Acting Group Vice President

Nuclear Energy

WFC/GRM/gp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator,
Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

GRM/001.LER

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